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UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

BRANCH OF RESEARCH

MONTHLY REPORT

OF

FOREST EXPERIMENT STATIONS
FOREST PRODUCTS
FOREST ECONOMICS
RANGE RESEARCH

December, 1927.

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BRANCH OF RESEARCH

December, 1927

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FOREWORD

CAN ORIGINALITY BE TAUGHT?

By H. P. Gillette, Editor, "Roads and Streets,"
November, 1927.

Pitifully few men are engaged in scientific research, in spite of the fact that economic progress is largely attributable to scientific discoveries. Thoughtful men are agreed that we owe very much to scientists who discover, and to engineers who apply the laws of nature. Yet even thoughtful men seldom suggest that there is crying need of vastly more scientific research. We suspect that the reason for this apathy is to be found mainly in a false conception of how scientific discoveries are made.

A great scientist, like Faraday, is commonly regarded as being a genius to whom is given an intuitive power far beyond that of other men. Indeed, great geniuses, like J. J. Thompson, have repeatedly talked of the marvelous intuition of the Faradays; and by this very sort of talk have aided in obscuring the methods by which scientists, great and small, accomplish their results.

If scientific discovery and all other forms of original thinking are the results purely of heriditary gifts, then there is perhaps slight reason in employing men to do original scientific work, for such employment will not add to their native ability, nor will the lack of such employment prevent their genius from flowering. However, it is beginning to dawn on men here and there that Edison was not joking when he said that invention is not the consequence of inspiration so much as of perspiration. And, as a result, research laboratories financed by great corporations are slowly becoming more common. Engineers are being hired to discover the secrets of nature and to make inventions based upon the new knowledge thus acquired.

When you come to consider the matter carefully, every thought is original to some extent. Every pellet of shot differs from every other one, in some degree; and no two ideas are ever more alike than two shot pellets. Even the bird that builds its nest each year like the one of the year before, still builds each nest slightly different from its predecessors. So every bridge that is designed differs from every other one. Bird and engineer alike show some originality in every one of their creations. Originality, then, is the commonest thing in the world. Yet it is usually spoken of as if it were the rarest.

(Over)

Since originality is not rare, a genius differs from the average man only in degree of mental power and in persistence of its application. Perhaps the degree of difference is not to be measured by the value of their respective achievements. Certainly brain power is not measurable by the wealth that a man accumulates. Why then should we think that it is measurable by any other sort of achievement?

"Full many a mute, inglorious Milton here may lie" appeals to us all as being a poetic line weighted with prosaic truth. Opportunity and training certainly have much to do with any man's success. Then may it not be that geniuses are largely the product of training and of opportunity? We think so.

Methods of attacking engineering problems are successfully taught in our engineering colleges; and these methods presuppose the application of at least some ingenuity. The very word engineer has a common root with genius, and the early use of the word engineer indicated that it was applied only to an ingenious man. Methods of original thinking are taught to engineers even now, but with insufficient accent upon originality.

At least two American universities have turned their teaching largely toward training men to become more original. This indicates a growing belief that originality of a high order is teachable. Once this belief becomes more prevalent we shall see thousands of research engineers where now there is one. Then the secretary of agriculture will no longer have to importune congress to appropriate more than a beggar's pittance for research work. Then our men of great wealth will endow fewer art museums and more research laboratories. Then diseases that now resist the inquiring efforts of a few scientists will capitulate to the massed assaults of hundreds of scientific minds. Then our greatest laudations will not go to some daring soul who has flown to the north pole in a machine invented by another, but to the greater soul who by his science made the machine possible. A far cry it is yet, however, across the oceans of ignorance that lie between the discoverer of a new scientific principle and the discoverer of a speck of ice in which centers the axis of the world.

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FOREST EXPERIMENT STATIONS

Washington

General

Bruce returned to Washington the middle of December to take up again his duties with the Forest Service. Reineke has been at the Appalachian Station since the latter part of November. He is expected back in Washington some time the middle of January. E. R. Martell reports in Washington the tenth of January for work in the Section of Forest Measurements. Buell and Day, who will be in Washington for some mensurational work this winter, arrived during December only to go upon leave shortly thereafter.

Two rush jobs are looming up for which we had made absolutely no provision in our schedule for the winter work. These promise to disrupt the work in Mensuration to a considerable extent. One has to do with the organization study of the Ranger Districts on the National Forests made by Loveridge of Operation; the other is a study of the National Forest revenues and the returns to counties as compared with revenues which may be derived from taxation of other similar lands.

Congress

The hearings on the Agricultural Appropriation Bill are to be held during the latter part of January. Hearings on the McSweeney-McNary bill will probably be held the latter part of February and the first of March.

A number of experiment station bills have made their appearance in Congress, including one by Senator Ashurst for a Station in Arizona, one by Representative Edwards for a forest experiment station and National Park in Jenkins County, Ga., one by Senator Ransdell for the enlargement of the Southern Forest Experiment Station to provide for hardwood research, and one by Congressman Leavitt for increasing the scope and size of the Northern Rocky Mountain Station.

Patent

The first patent issued to a member of the forest experiment station staff is that granted to Duncan Dunning for his increment core measuring device. Mr. Dunning's letters patent is No. 1,653,892.

Library

During December there were 891 loans of books and periodicals from the library, and 140 members of the Service and others consulted the library in person.

The number of books and periodical articles indexed for the card catalogue was 173.

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NORTHEASTERN FOREST EXPERIMENT STATION

During the past season Westveld spent considerable time mapping in detail a series of slash disposal plots on which different methods of slash disposal had been practiced. The plot on which both hard and softwood slash had been lopped was mapped and the slash classified on the basis of its density. The data have now been compiled, and show that the removal of 8,750 board feet per acre: 4,690 of which was softwoods and 4,060 hardwoods, resulted in covering 39 per cent of it with slash, 17 per cent being covered with coniferous and 22 per cent with hardwood slash. Calculated on the basis of equal volumes of hardwood and softwood removed, resultant softwood slash covers only 59 per cent as much area as hardwood slash. Classifying slash on the basis of density the data further show that 18 per cent of each acre is covered with dense slash, 13 per cent with medium, and 8 per cent with light. Although hardwood slash tends to occupy a greater surface area per unit of volume removed, much of it falls in the class of medium and light slash. In fact 32 per cent of the hardwood slash was classified as dense as against 62 per cent for coniferous, showing the tendency for softwood slash to compact itself.

Behre completed a revision of his preliminary yield tables for western yellow pine, submitting the full technical report to the Journal of Agricultural Research, and a condensed popular edition to the University of Idaho for publication. The popular edition condensed the results covering the entire range of site indexes into three groups designated as "good," "medium," and "poor" sites. These correspond to sites averaging 95, 75, and 55 feet in height at 100 years of age, and do not represent the extremes in either direction as the complete report shows a range of site indexes from 45 to 130.

Satisfactory progress is being made on the analysis of the form study data. Practically all the trial computations of linear regression equations have been completed and tentative conclusions have been drawn as to the relative influence of various factors on bark thickness, butt swell, and form quotient.

Stickel submitted to the Journal of Forestry an article entitled "Comparative Forest Fire Hazard in the Northeast." This work embraces a preliminary examination of the fire weather data of the four stations in operation last field season. All stations were in operation simultaneously for a period of 109 days. During that time, the moisture content of the duff within the forests of the northern mixed hardwoods-softwoods type (Cranberry Lake, N.Y.) did not fall below 15 per cent. The moisture content of the duff within the forests of the white pine type (Petersham, Mass.) was less than 15 per cent just twice as many times as was the duff within the forests of the red spruce-balsam fir type (Smyrna Mills, Maine). In clear cuttings, the relative hazard of these types appears to be as follows: White pine type, northern mixed hardwoods - softwoods type, lower pure spruce slope type, and red spruce - balsam fir type, with the first type approximately twice as hazardous as the last two types.

Spaulding spent the month of December at headquarters, making routine reports, working on manuscripts, and identifying specimens of wood-rotting fungi accumulated during the summer.

MacAloney is preparing a resumé of the white pine weevil work for the past four seasons, and expects to have it ready for publication in the near future. Hall, who is doing graduate work at the University of Michigan School of Forestry and Conservation, spent a day at the office in conference with MacAloney on the preparation of his bronze birch borer progress report.

The temporary force spent the entire month on compilation work in connection with the various major projects. Although most of the permanent force were absent on annual leave during the latter part of the month, considerable progress was made in the preparation of the investigative program for 1928.

A. R. Trist, a research forester from Australia, visited the station early in the month. Mr. Trist will be in the United States for two years, having been sent by his Government to study forestry conditions in general, but particularly to study the organization of experiment stations and methods of carrying on research, with a view to the establishment of a forest experiment station in Australia on his return to that country. He is at present engaged in study at Yale Forest School.

Meyer, from the Pacific Northwest Forest Experiment Station, spent a day at the office, greeting his former associates, and going over in detail with Behre and Wheaton his study on the application of normal yield tables.

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CENTRAL STATES FOREST EXPERIMENT STATION

General

Work of the Station was materially affected by the time taken in annual leave during the month. Day, Kellogg, Hanley, and Meyer were on leave during part of this period. Mrs. Grace P. Bonner completed a three months temporary appointment on December 14.

McCarthy and Meyer attended the American Association of Science meetings at Nashville during the last week of December. Meyer presented a paper before the Physiological Section of the Botany Society of America.

Gilbert Hills who had been employed during the summer and fall on field work, completed his service with the Station on December 2 and later arranged to report on January 1 to the Southern Station. Hills took the opportunity to attend the meetings at Nashville on his way to New Orleans.

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The volume table work on Scarlet Oak was pursued consistently by Hanley, Bower, and Kellogg. It was found advisable to make calculations of board foot volume for all trees below 10" dbh. in order to secure more complete volume figures for the oak plots in the yield study to follow. This was done for all species of oak. As a matter of interest regarding the relative advantages and disadvantages of using machine-sorted and hand-sorted data, the table of total peeled cubic volume for scarlet oak was constructed using both methods of sorting data. Following are the results of the work as far as the checks are concerned.

Data	Average % Deviation	Aggregate Difference
Machine sorted (odd av. inch and height classes)	8.45%	.04%
Hand sorted (even av. inch and height classes)	7.98%	.367%

The prescribed limits of error are 0.5 - 1.% for aggregate difference and 6 - 9% for average deviation.

It appears from this that one method is about as accurate as the other - the differences probably being due to variations in the drawing of the form factor curves. When superimposed, the curves of the two tables almost exactly coincide. The machine sorted data do not give the limits of tree data in the final table form without making a separate tally to determine these lines.

Day left for Washington during the month on detail to work with a group of men from other stations in the further computation of oak volume tables. The rumor has come to us that another method of volume table computation has been devised. Unless this provides for recognition of former classes, it will leave still another method of construction to be devised.

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APPALACHIAN FOREST EXPERIMENT STATION

General

Advantage was taken of Reineke's visit to code the data for card punching for the surveys of hardwood reproduction in the mountains and of loblolly pine on the Coastal Plain. For the hardwood survey plans for coding and punching were prepared by Reineke and Buell and the card punching, by Scholz and Morey, was well advanced at the end of the month. MacKinney's loblolly pine party, which arrived in Asheville December 21, spent the remainder of the month in preparing the field data for card punching and in making growth rate determinations from cores and sections brought in. Reineke reviewed Korstian's manuscript on southern white cedar, going over it in detail with Korstian.

Several members of the staff attended, unofficially, the meeting of the American Association for the Advancement of Science, held at Nashville, Tenn. While it was anticipated that the programs of many of the sections would contain papers of interest to foresters, the large number of these and their important bearing on present and proposed investigations of the Station was a revelation. The general program of the meeting was full of such papers, and only a few could be heard. Of these special mention should be made of the following:

Ecological Society:

Forest humus, a problem in soil microbiology, by Dr. S. A. Waksman

Mycorhizal fungi of forest soils and their relation to tree growth, by Dr. Elias Melin.

The present status of our knowledge concerning the ecology of protozoa of the soil, by Dr. C.E. Skinner.

The measurement of physical factors as an aid to silviculture, by G.A. Pearson, Southwestern Forest Experiment Station.

Botanical Society:

Wood and oleoresin formation in turpentined longleaf pine as affected by spring forest fire, by Dr. Eloise Gerry, Forest Products Laboratory.

Traumatic responses of Pinus jeffreyi as related to the commercial production of heptane, by Dr. Eloise Gerry.

Application of Bose's theory of sap rise to ten species of trees, by Dr. H. M. Benedict.

Factors in the frost resistance of the leaves of native Ohio evergreens, by Dr. Bernard S. Meyer, Central States Forest Experiment Station.

Botanical studies in the Southern Appalachian Mountains, by Dr. H. L. Blomquist.

Mycorhizas of deciduous trees, by Dr. W. B. McDougall.

How root systems are modified by competition with grasses, by Dr. J. E. Weaver.

Society of Plant Physiologists:

The reflection of light from leaf surfaces, by Dr. C.A. Shull.

Dormancy in the seeds of Gymnocladus dioica, by G. J. Raleigh.

Entomological Society:

Phytopathological Society:

Many papers of interest to forest entomologists and pathologists were read.

Association of American Geographers

Symposium on the Mississippi flood, eight papers, that by H. H. Bennett, on aspects of soil erosion in the Mississippi basin, being of especial interest.

Aside from the papers themselves the contacts made informally with scientists in lines related to forestry were of particular value. Some of these were of direct value to the work of the Station on account of pending cooperation.

The Association sessions were made the occasion for calling a meeting of the Appalachian Section of the Society of American Foresters. About thirty foresters were present from many of the eastern States. Altogether the Nashville meetings were thoroughly stimulating and worth while, and they point to the great advantage to foresters of taking in the Association meetings whenever it can possibly be done.

Improvements in the Bent Creek water system, designed to permit the draining of the pipes without emptying the tanks, were put in under the supervision of Buell and later of Scholz. These improvements tested out perfectly under the record below zero temperatures at the end of the month.

Loblolly Pine Study

MacKinney's party continued field work in Pender County, N. C., on the study of reporduction and growth of loblolly pine after cutting. Korstian and Reineke spent a few days with the party early in the month, developing a plan and beginning work on a study of the rate of diameter growth at different points on the stem. Borings were made at regular intervals from breast high to the crown.

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ALLEGHENY FOREST EXPERIMENT STATION

By all odds the most important development of the past few months is the final decision as to headquarters. We are to be located in Philadelphia in cooperation with the University of Pennsylvania, and will move into temporary rooms there on January 3. Before spring a small three-story dwelling on Woodland Avenue, directly opposite the University buildings, will be turned over to us as permanent quarters. The University is furnishing us with heat,

light, and janitor services, in addition to the quarters, and we are looking forward to a very satisfactory physical plant.

The chief reasons for locating the station headquarters in the third largest city in the United States are the central location of Philadelphia, from which we have splendid rail communication with all parts of our territory, and which should afford us corresponding contact with the foresters of our territory; and the opportunity for affiliation with a very powerful university, the graduate department and research work of which are internationally known. The long delay in confirming the tentative choice of Philadelphia, approved by the Secretary in September, has been the necessity for arranging for our use of a suitable headquarters tract within 25 miles of the city. The recent boom in suburban real estate has made the majority of landowners in the vicinity of Philadelphia unwilling to tie up their properties for a period of years, and has made it difficult to reach a long-term agreement. The problem is finally solved through the use of a tract of several hundred acres near Medford, New Jersey. This is owned by the Y.M.C.A. of four counties, which desires to protect the approaches to a couple of small artificial lakes. A fairly satisfactory cooperative agreement, covering a period of 40 years, has been signed. This places at our disposal probably 400 acres of forest land, most of it covered with a mixture of pine and hardwoods about 20 years old, growing on a fair variety of soils. The tract is in unusually good shape for south Jersey, and what we learn on it should be applicable over very considerable areas.

Junior Forester G. Luther Schnur reported for duty on December 14. Schnur is a graduate of Wittenberg College and of the Yale Forest School, and comes to us after a year and a half of administrative work in that cradle of research men - the Southwest. Whether District 3 appreciates this characterization we do not know!

We are beginning to form contacts and learn something of the territory assigned to us. Forbes addressed the northeast Philadelphia Chamber of Commerce and one of the garden clubs of Baltimore. All of the men made the acquaintance of those in charge of the annual exhibition of the Carnegie Institution in Washington; we suppose we may claim the Institution as being in our territory. Our temporary location in Washington has made it possible to form acquaintances in the Bureau of Soils and the B.P.I. Forbes spent two days at Pennsylvania State College getting acquainted with the summer's work by A. C. McIntyre of State College, done with the help of our two student assistants, Kirkham and Craig. It is very evident that Mr. McIntyre has made an excellent start in evaluating the problems connected with his investigation of the scrub oak areas

of Pennsylvania, and it is most refreshing to find that he has already prepared a progress report, now in the hands of a typist. Junior Foresters Wood and Hough spent a week or ten days in the Office of Computations in Washington in connection with the oak study of Director McCarthy of the Central States Station, with whom we are planning considerable cooperation in this field.

The staff has made substantial progress in getting together a library. We have ordered a set of the Library of Congress cards covering American and foreign forest literature since 1910. We have inherited Mr. Sudworth's nearly complete set of Forest Service publications; would that we might use them with as much profit as their former owner! The compilation file in Washington has been ransacked for material pertaining to our region, and we have examined such project reports of adjacent stations as seem likely to throw light on our problems.

While the other members of the staff were on annual leave, Forbes made a start on the revision of his Southern Pine Growth Bulletin. This, all critics (kindly and otherwise) are agreed, is in need of a major operation. If the manuscript survives the shock, it will appear in two parts, one a supposedly popular presentation, the other more technical.

SOUTHERN FOREST EXPERIMENT STATION

General

Professor G. H. Lentz, on sabbatical leave from Syracuse, joined our force early in the month. He is to spend his entire time on investigations of Southern hardwoods. This study is being financed by the Louisiana Department of Conservation but is to be carried on under the direction of the Southern Station. Lentz is making a broad survey of the field, going over all available literature on the subject, and canvassing the hardwood operators by means of questionaires. Detailed studies will not be made until the general economic phase has been investigated.

Demmon, Barrett, and Wahlenberg contributed articles for use in the "Conservation News" published by the Louisiana Department of Conservation. Demmon, Wakeley, and Harper attended the meetings of the Association for the Advancement of Science and were visitors at the annual meeting of the southern Appalachian section of the Society of American Foresters at Nashville, Tenn.

Visitors to the New Orleans office during the month included Dr. H. B. Pierson, state entomologist of Maine, D. E. Lauderburn, extension forester of Mississippi, J. K. Johnson, forester for Great Southern Lumber Company, Bogalusa, Louisiana, H. F. Smith, State Forest Inspector of Alabama and Professors Hayes and Marckworth of the Louisiana State University Forestry School.

Protection, Fire

Barrett drew up a very striking graph illustrating the retardation of height growth on longleaf pine by fire at Urania in the Roberts Plot.

At McNeill, Miss., Wahlenberg made the fall burn on the longleaf pine fire plots. For some time it seemed as if the damp weather would make burning impossible, but the litter, although not thoroughly dry, produced a hot fire because of the two year's accumulation.

During his recent visit to our grazing and burning experiment at McNeill, Dr. Henrick Hesselman expressed the opinion that the practice of annual burning was compacting the soil in a manner that would be detrimental to the forest. On the assumption that the effects might already be apparent Wahlenberg attempted to obtain a measure of the effects of annual burning on soil density and moisture content. He first devised an instrument with which to measure the volume of soil samples in their undisturbed field state. This consisted of a piece of thin brass pipe about six inches long and 1.2 inches in diameter, rounded at one end for a handle (a fitting of drain pipe for a bathroom wash bowl) sharpened on the outside to keep the inner bore constant and provided with a plunger for removing the sample. A scratch on the pipe about two and three quarter inches from the end marks the point of 50 cc. inside measurement. Samples of 100 cc. of surface soil were then readily taken by two insertions of the instrument. In this way 1600 cc. of soil were taken from each plot, the burned and the protected, on closely adjacent areas where the vegetative types were uniform and the soil type was the same (Orangeburg fine sandy loam). Fortunately there were no rock particles to interfere with the field measurements of volume. In the office the usual procedure of oven drying was used, followed by measurements of soil particle volumes by water displacement. The results have been tabulated as follows:

Density and moisture content of soil

	Vol. of Soil Samples c.c.	Moisture content %	Specific Gravity Field	Specific Gravity Particle	Porosity or air space %
Fully stocked stand of saplings.					
Protected from fire	800	10.1	1.28	2.22	42.3
Burned annually	800	8.3	1.38	2.32	40.5
Open pasture grass land					
Protected from fire	800	12.9	1.39	2.36	41.0
Burned annually	800	10.6	1.49	2.41	38.0

Note: Porosity was computed as equal to the real (or "particle") specific gravity minus the apparent (or "field") specific gravity, all over the real specific gravity, and times 100.

The figures are consistent in that they indicate a moister, less dense, and more porous soil in the pasture protected from fire. Possibly the differences are insignificant in amount, but the results strongly suggest a larger humus content in the protected soil. It is planned to repeat these tests and possibly make determinations of humus and nitrogen content as well.

Ten or more tests of soil reaction were made on each of the four plots; in all 55 tests on the quadrats distributed over the area. The pH values ranged from 4.7 to 6.5, but showed very slight variations as a whole and averaged close to 5.0 for all plots, indicating a strongly acid condition. This applied to the surface soil, but a few borings with a soil auger indicated no significant changes in reaction to a depth of three feet.

Management

A good crop of longleaf cones was produced at McNeill, Southern Mississippi this year. The seed trees on our 320-acre tract averaged twenty-four cones per tree. The seeds started to fall about October 20. Most of them had been shed by the end of November, but a few were still coming down during the first half of December, as indicated by the catch in our traps that were last

examined on December 14. There was no indication at this time that seeds were failing to reach mineral soil by being "hungup" in the grass on the area which has not been burned for the last five years, except in parts of the ungrazed plot. Here the tall grass had become matted down by rain in several places, and numerous seeds were observed lying on this matted grass. Some of these seeds, and others resting on the screen wire of our traps, had germinated where they lay about six inches above the soil. Our six mil-acre seed traps are obviously inadequate in number to give anything but a rough idea of the number of seeds produced per acre, but they give some indication. After cutting tests had been made from four collections, the results indicated that where seed trees are at hand 71,000-82,000 good seeds fell per acre. This would apply roughly to perhaps two thirds of our tract, the balance probably receiving only about one fifth as much seed.

Naval Stores

The month of December saw the completion of field work on all tracts except for one fire line at Sampson City. We are in position now to start work on all tests in 1928. This is several weeks earlier than in previous years. During the month the raking of trees was finished on all tracts and the jump streak was put on at Kingsley Lake. All cups were taken down and gathered up at the Powell tract, which tract is now worked out and abandoned. The raising of tins and cups at Sampson Lake was about finished during December. The new test on the relation between weather and yield of gum was started off during December, and four streaks were placed on the trees. These trees are now being rearranged into seven groups of equal yielding power, and early in January the daily weighing of gum on these groups will be started.

Dr. Craighead and Mr. J. A. Beall, of the Bureau of Entomology, visited Starke and looked over the old turpentine faces at Sampson Lake. It was found that about 25 per cent of the faces on those trees which had been severely worked showed attack by the turpentine borer, Buprestis apricans. No emergence holes were seen since the normal life history of these insects is three years, and attacks were made for the most part in the ax cuts used for the insertion of tins in the spring of 1924. The insects were not able to get at these cuts until the tins were taken out again in the spring of 1925. Following their visit to Starke Dr. Craighead, Mr. Beall and Wyman visited the Choctawhatchee division of the Florida Forest and looked over the borer damage on the experimental area in Section 28, which was turpentined in 1915 with four styles of work. The damaged faces in the various tests were as follows: regular American style of work, 19 per cent; narrow

faced American, 15 per cent; French faces, 8.5 per cent. The attack in nearly every case took place at the point where the faces were chopped for the raising of tins. The attack of the borers in old burned faces is very high, amounting to about 90 per cent or more. It was agreed that with careful work and the doing away with ax cuts for the purpose of raising tins it would not be difficult to keep the attack of borers down to a very low figure. Of course fire protection will be necessary as well.

Miss Spuhler completed her detail to the branch station at Starke and Camp Pinchot and left them in position to keep their files and office procedure in good shape.

Forestation

The Great Southern Lumber Company supplied the station with 16 pounds of longleaf seeds for germination and storage tests. Wakeley has started a new series of seed storage tests with longleaf pine, using six different methods. Much of the past work on such problems has not been fruitful because of faulty technique and control.

At Bogalusa, Wakeley labeled the plantation groups with metal tags. Small lots of Monterey pine and cypress were planted during the current month. Planting stock of these species was also shipped to the branch stations at Starke, Florida, and to Camp Pinchot, Florida. Demmon and Wakeley spent a few days with Gemmer at Camp Pinchot in planting and other work. In addition to planting about 1300 seedlings, 300 seed spots were made on open plowed ground, 100 on a similar open area not plowed but on which the competition of brush had been removed, and 100 spots in the brush. Over 400 seedlings were planted as replacements in last year's plantations. Besides his work on nursery beds and plantation examinations Gemmer with some help from the Staff has begun an interesting study of competition by washing the top soil away from the roots in order to observe their habit of growth.

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CALIFORNIA FOREST EXPERIMENT STATION

General

The Society of American Foresters' annual meeting in San Francisco and the forest school conference in Berkeley took up a large share of the time of Kotok, Hill and Brundage who served on arrangement committees. Both the Society meeting and the school conference were well attended. Lowdermilk presented a paper on forest influences.

The names for the Station Advisory Council have been sent the Forester for submission to the Secretary. A group of twenty men of varied interests is being proposed. The first meeting of the Council is planned for February.

Fire

Clements continued through December the compilation of fire statistics for the northern forests for the years 1921 to 1926. This phase of the work is now complete. Kotok will go to Washington early this month where the data will be analyzed with the aid of the computing machines in the computing section.

Through cooperation with the District Office Downs is being retained to work up in a similar way data for the Southern California forests, which have never been analyzed.

Type Map

Having covered the higher Sierra during the summer, and the foothill region during the fall, Wieslander has now gone to Southern California to organize mapping the Angeles. A crew of six men is available due to cooperation by the District Office, the State, Los Angeles County and the Angeles Forest. A type classification has been devised to meet the needs of protection and other interests, and field procedure worked out.

Dr. F. E. Clements spent a day at the Station going over plans for the type map and influences study. He contributed a number of valuable suggestions towards making the type study as widely useful as possible.

Management

The work of compiling data for the methods of cutting bulletin are again under way. The damage and cost computations for the selective logging area on the Stanislaus are being done by Berry and Hughes in the District Office.

The results for a 160-acre extensive plot on a Stanislaus sale area have just been completed. This plot is intended to furnish more reliable data on losses than can be obtained from small plots. Losses since cutting in 1923 have amounted to 3.65 per cent of the stand left, which averaged 13,300 bd. ft. per acre. Wind and bark beetles were the principal causes of loss. As shown by previous studies losses were heaviest in the large mature trees of Classes 3 and 5. This is especially true of insect losses.

Some growth prediction data for a management plan on the Sierra was reviewed. Repeated demands for this sort of material have led to the detail of Riley to the Station from the Modoc to compile all available material useful in management plan preparation.

Entomology

Person has just finished an interesting report on the disposal of line slash in relation to insect control. Five methods of treatment were tried as follows: 1. Trees felled only. 2. Trees felled and limbs cleared away. 3. Trees felled, limbed and covered with brush. 4. Trees felled, limbed, covered with brush and burned. 5. Trees felled, limbed and lower half of trunk covered with brush or covered and burned.

The principal insects attacking were Dendroctonus brevicomis, Ips confusus, Melanophila sp. and Graphisurus spectabilis, only the first two of which are very primary. Dendroctonus attacked 25 per cent of the bark area of trees treated by the first method. Brood development was better than in trees treated by the other methods but was much poorer than in standing trees. Ips developed in 45 per cent of the bark area. For trees treated by the second method, 30 per cent of the bark area was attacked by Dendroctonus, but the number emerging was 10.5 beetles per square foot less than the number attacking; only 8 per cent of the bark area was entered by Ips. The third method resulted in 38 per cent of bark area attacked by Dendroctonus, emergence being 6.6 beetles per square foot less than entry. Ips developed in 28 per cent of the bark area. For trees treated by the fourth method only 4 per cent of the bark was attacked by Dendroctonus, emergence being 3.0 beetles per square foot less than entry. Ips attacked 6 per cent of the bark area. For the fifth method results showed 22 per cent of the bark area attacked by Dendroctonus with emergence being 9.0 beetles per square foot less than entry. Ips attacked 33 per cent of the bark area.

Southern California

The instrument installation for the forest influences study at Devil Canyon was scheduled for completion in early December, but the Plunge Creek fire which started on the 4th disorganized the construction crew and seriously interrupted the work. The end of the month, however, saw all major construction completed. The few rains of the month gave the first test to the mechanical rainfall and run-off recorders on the superficial run-off plots which are being used by Lowdermilk in this special phase of the Barranca study.

At the nursery the outstanding event is the damage caused by a wind storm on December 17th. This storm completely demolished the barn which served as workshop, garage, and storehouse, blew down two chimneys of the dwelling, and did a variety of damage all over the nursery.

Lodgepole Pine Data

Mr. Brundage completed the collection and compilation of data respecting lodgepole pine in this district, and forwarded the information to District 1 in accordance with the request of their office of Products.

Pulp and Paper From Sawmill Waste

To some extent a reverberation of the recent high pitch of excitement among irrigation district interests and agriculturists generally, in the Sacramento Valley, over wasteful timber cutting on lands of the Pickering Lumber Company adjacent to those of the Stanislaus National Forest, and their possible denudation, was the calling of a meeting, at Sacramento, of the Sacramento Valley Regional Industrial Committee of the California Development Association. The object of the meeting was to canvas the possibilities of establishing new industries, especially pulp and paper, in or adjacent to the Sacramento Valley, to utilize the wood wastes of the lumber industry tributary to the region. About twenty members were present, including some of the ablest business men of the central part of the state. At the request of the Association Mr. Hill addressed the Committee, presenting the case of waste utilization, both mechanical and chemical, as far as he was able, with reference to the profitable establishment of waste utilization enterprises. While feeling it necessary to discourage them at the present time, in respect to most phases of chemical utilization, he presented the need for surveys of the waste actually produced in the state and of the requirements of the wood-using industries which might use sawmill waste, and the merits of cooperative financing of such surveys.

California Economic Research Council

A very interesting conference was had during the month with Dr. T. Wayland Vaughan, who is Director of the Scripps Institution of Oceanography of the University of California, at La Jolla, California, in reference to the needs of their work on the relation of Pacific Ocean temperatures to the climate of Cali-

fornia. A related phase, in which he was also interested, concerns surveys looking toward the widespread establishment of recording stations for ocean surface temperatures. Besides its immediate relation to Dr. Vaughan's work, this phase would be of very great importance to the problems of both the U. S. Weather Bureau and the Coast and Geodetic Survey. Both of these agencies are anxious to cooperate in starting the surface temperature work, but neither has been able thus far to secure authorization for it. The matter came to Mr. Hill as one for the consideration of his Committee on Natural Resources of the Economic Research Council.

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PACIFIC NORTHWEST FOREST EXPERIMENT STATION

December has been a quiet month in the office due to holiday absences and trips to California to the Society of American Foresters' meeting. Meyer has been in the East the entire month, a part of the time on duty in the Washington office on matters connected with the Douglas fir yield study. Early in the month Munger, Isaac, and Westveld left for California and there attended the conference of Forest Schools and the S.A.F. meeting. Also, each had about a day at the California Experiment Station discussing problems of common interest between the two Stations and getting pointers on their office procedure and technique.

The S.A.F. meeting was very well worth while, not only on account of the excellence of the papers and discussions, but because of the opportunity for contact with other research men, teachers, and technical foresters of the West who rarely get together. The redwood trip left two outstanding impressions, first, that the operators in that region have an excellent opportunity to put their lands on a continuous production basis and that a number of them are actually doing so in a substantial way, and, second, that a very aggressive and successful effort is being made by California to recognize the tremendous recreational value of these redwood forests and to preserve a liberal amount of virgin timber along her Redwood Highway.

Simson spent a few days on the lightning study and had the help through part of the month of Ranger Hewlitt as a temporary assistant in the compilation of last year's reports. Hewlitt has been mapping the course of each lightning storm on large National Forest maps in order that their geographical distribution may be obtained. Most of Simson's time went on the static data upon which he also had the assistance of Miss Krogness.

Computation of the Douglas fir understocked sample plots went forward uninterruptedly by temporary assistant Moravets.

Munger at Spokane attended a meeting of the Western Scientific Association. At one of the general sessions he gave a paper on "Some Forest Problems of the Northwest, Particularly as they Relate to Sciences other than Forestry." There were two sessions of the forestry section at which interesting papers were presented by the Inland Empire and Northern Rocky Mountain men. Attendance at this meeting ga ve an opportunity for Munger and Weidman to discuss some matters of importance to the two Stations. The Association passed a resolution endorsing the McSweeney-McNary Bill.

A review of how our time was spent in 1927 indicates the following number of days away from headquarters. This includes time at meetings as well as at branch stations and in the woods.

T. T. Munger	109½ days	
L. A. Isaac	166 "	
R. E. McArdle	60 "	(Jan. 1 to Sept. 12 only)
W. H. Meyer	151½ "	
A. G. Simson	232½ "	(In residence at Wind River)
R. H. Westveld	154½ "	

Other stations may be interested in our experience in automobile operation. The following figures for our three cars were taken from the Form 469 reports and cover all the strictly "operation costs" except Forest Officers' time, which in every case was of a minor amount and incidental.

Type of Car	Number seasons in use	1927 Miles run	1927 Cost per mile	Cumulative to date Miles run	Cumulative to date Cost per mile
Dodge Touring	4	7,939	.038	28402	.038
Ford Roadster (box)	3	5,472	.033	19515	.031
Dodge Roadster (box)	2	5,567	.024	8872	.031

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NORTHERN ROCKY MOUNTAIN FOREST EXPERIMENT STATION

In order to finish an exceptionally heavy schedule of fall field work, which had been much interrupted by unfavorable weather, Kempff, Marshall, and one field assistant continued out-door work at the Priest River Station until well along in December. The last jobs were a periodic examination of the test plantations dealing with western yellow pine from different seed sources and the establishment of two methods-of cutting plots.

The source of seed plantations contain 21 plots, the first of which were established in 1911. The plots represent the races of western yellow pine from 19 localities over a wide range of country from the Black Hills to the Siskiyou Mountains, and from northern Idaho to Arizona and New Mexico. Kempff's report shows the differences in height growth and general development and the reactions to local climatic conditions displayed by each plot. The main conclusions so far are that temperature has exerted a greater influence than other meteorological factors in the local adaptation of the different strains, and that seed collected north of a line through the Black Hills and Blue Mountains has produced hardier, thriftier, and more rapid growing trees than the seed from south of that line. Another result is that seed from the local region produced the best progeny where it was collected from parent trees between an altitudinal range of 2500 to 5500 feet. As this is based on only 3 plots, however, it should be accepted as an indication of what to expect rather than a final conclusion.

The methods-of-cutting plots just established are a parallel set devoted to the understory problem, in which one has the understory left intact and the other has it removed. The plots are excellently situated on a small timber sale in the demonstration forest. Veteran seed trees will furnish an ample supply of white pine seed to both plots. The object of this experiment, of course, and one Forest Management is greatly concerned about, is to determine whether it is better practice, economically and silviculturally, to secure the next harvest from a new crop or from the understory stand. It is important to mention that the new crop starting on bare ground has an excellent chance of containing a large percentage of western white pine, whereas the underwood stand is made up of hemlock, fir and cedar and will largely hinder and prevent the starting of white pine reproduction. Moreover, the understory stand, here as elsewhere in the white pine type, contains not a few suppressed and fungous infected trees.

Several meetings were attended by members of the staff in December. Gisborne went to that of the Society of American For-

esters at San Francisco in place of Weidman, who could not spare the time from the public requirements bulletin on which he is concentrating all his efforst. Gisborne reported a very stimulating and educational meeting and a highly interesting field trip to the redwoods. His observation is that a mature redwood stand is apparently as near fire-proof in its fuel volumes, bark thickness, and climate as a forester could ask for. Weidman, Kempff, and Marshall attended the annual meeting of the Northwest Scientific Association held in Spokane, All three men presented papers before the forestry section entitled, respectively: "Forest Research Activities in the Northern Rocky Mountain Region," "Non-indigenous Western Yellow Pine Plantations in Northern Idaho," and "Life Histories of Some Western White Pine Stands." Munger was also present at this meeting and gave a very interesting paper. Entirely by coincidence Weidman's paper happened to follow logically in practical application the thought of Munger's topic. The paper on forest research activities dealt with the investigations of all the agencies in the region including pathology, entomology, products, grazing, and fire weather, and stressed interrelationship and coordination of effort.

In connection with the forest research activities in the region, it is interesting to note the total amount and also the number of agencies engaged. There are about 70 projects carried by 6 different agencies. Of all the forest research, the Forest Service performs about 60 per cent, the Bureau of Plant Industry 20 per cent, the University of Idaho 8 per cent, the Bureau of Entomology 7 per cent, the Weather Bureau 3 per cent, and the University of Montana 2 per cent. A conservative estimate indicates an annual expenditure of about $60,000, and human effort equivalent to the full-time employment of 15 men. The research work of the Forest Service represents the efforts of 9 men, of which 5 are connected with the Experiment Station, 3 with Products, and the equivalent of one with Grazing, Management and Protection.

The meeting at Spokane furnished an excellent opportunity for a conference between Munger and Weidman on western yellow pine slash disposal, protection and logging practices in Oregon and Washington. There have been many developments in that region during the last few years, particularly on the part of private operators, which it was necessary for Weidman to learn about in connection with the revision of his public requirements manuscript.

Gisborne's trip also furnished desirable opportunities for conferences with various men on fire studies. In this connection he stopped at Portland to talk with Brundage, Osborne and Simson. He also spent a half day in Berkeley with Kotok, and a few hours with Major Bowie and Mr. Gray of the Weather Bureau in San Fran-

cisco. On the return trip some time was available for a short conference with Mr. Keyser, in charge of the Spokane office of the Weather Bureau. From these discussions Gisborne is convinced that the experiment stations and administrative organizations in Districts 1, 5, and 6 are in close agreement as to the very important role in fire protection played by weather forecasting, and on the high priority that should be given this cooperative project with the Weather Bureau.

In each region there are certain conditions which modify the manner and the intensity of the attack on this problem. In District 6 lightning storms are not usually as important as in Districts 1 and 5, and their study is not deemed so important. In District 5 high-elevation forest stations are being used almost exclusively in reporting weather conditions which determine localization of the daily weather forecasts, whereas in District 1 low-elevation stations are being equipped first for this purpose. Different conditions dictate these different methods. All Districts agree that one of the first jobs ahead is the selection and equipment of forest weather stations. It is also generally granted that after equipment is completed a period of at least one year, and often two or three seasons, is required before dependable reports are received. The equipment should be provided in all cases by the Weather Bureau from their funds for that purpose. In Districts 1 and 5, at least, the fire-weather specialists of the Weather Bureau are not as yet devoting their full time to the problem to which they are assigned. Major Bowie states that these specialists should be able to give full time to their own projects from now on.

From his discussions on this trip, Gisborne found that he and Show and Kotok were in agreement on the importance of studying going fires, but that District 6 does not seem to be so strong for this type of research. Kotok favors the study on a rather long fire front, whereas Gisborne favors the use of sample plots of 1/10 to 1/4 acre in area. Both agree that each method should be tried, and that it may be found that under certain conditions one method will be better, whereas under other conditions the other may be superior. It is also agreed that two or three seasons' work may be required merely to develop a satisfactory technique of observation and measurement.

With the completion of various field and laboratory projects at the Priest River Branch, performed in cooperation with Kempff, Marshall returned to Missoula at the end of December. He is quite proud of establishing what he believes is a record field season for experiment station men. He was in the field this year for a period of 224 days. Another matter of personnel interest is the detail of Forest Ranger Fry to the Experiment Station for two to three months this winter. Mr. Fry is to be engaged on the compilation of weather records and lightning study reports.

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Office compilations and review of field notes are the order of the day. Krauch and Lexen have moved to Flagstaff for the winter.

Lexen has given some time to the compilation of diameter growth data collected on the Weiser before he came to this District. He plans to complete this work shortly as the data are desired by District 4 in preparing a management plan for the Weiser. Increment cores were taken on cuttings 34 to 38 years old. The results for western yellow pine agree with those obtained in District 3 in that average diameter growth in broad diameter classes is practically constant, that is the average diameter growth for trees from 11 to 15 inches is practically the same as for trees in the 25 to 30 inch class. In order to obtain such a relation, the cutting must be such that the larger trees which are left have practically unlimited growing space. Apparently this was the condition in which the old private cuttings were left. This is also the condition on present day Forest Service cuttings in District 3. Trees over 20 inches d.b.h. are usually isolated trees with full crowns or, if in groups, they are in most cases given ample growing space by the removal of overmature or defective neighbors. Given a healthy crown and sufficient room for development both above and below ground, it is not unreasonable to expect the same diameter growth in a large tree as in a small one. In District 3, it is a known fact that "yellow pines" 300 years old, if they have good crowns and abundant room, put on as much diameter as trees 100 years old. Increment should be proportional to effective leaf surface and root area. As a tree increases in diameter, crown and root area should keep pace if there is room for normal development, but when neighboring trees interfere the expansion of crown and root eventually ceases and diameter growth is retarded. It has been found that in dense Douglas fir stands, large trees do not respond promptly to cutting, evidently because a number of years are required to build up the crown and root system necessary for increased rate of growth. It is conceivable that the same might be true of dense mature stands of western yellow pine.

There appears to be a discordant note in the comparison between old cuttings and present day Forest Service cuttings in that in the former large trees were not often left unless they were defective. It is probable, however, that most of those which were in poor physiological condition at the time of cutting died soon after. Moreover, in selecting trees for increment cores, distinctly abnormal specimens are usually eliminated.

Sample plots in the Engelmann spruce type of the Carson show that there has been a heavy loss from windfall since the cutting five years ago. About 8 per cent of the trees have gone down in the cutover area as compared with one per cent in neighboring virgin stands. Most of the windfall has occurred along roads and trails made in the course of cutting operations. Around two per cent of the stand has been killed by barkbeetles which apparently have followed the windfall rather than the cutting. In view of these losses together with the general failure of reproduction, it must be conceded that we have much to learn about cutting in the Engelmann spruce type. The same might be said of the Douglas fir type. Fortunately, the area thus far cut over in these types is not great and there is no immediate prospect for large sales.

A check up on a series of seven thinning plots, including two unthinned controls, in 40-year western yellow pine stands show that before thinning there were an average of 1462 trees per acre ranging from 1 to 11 inches in diameter. The dominants averaged from 25 to 30 feet in height on the various plots. The average volume per acre was 1690 cubic feet, and the mean annual increment 42.2 cubic feet. After cutting, the number of trees per acre on the five thinned plots was as follows: 363, 469, 802, 876 and 1013.

An analysis of diameter growth on two sample plots in western yellow pine 10 years after cutting brings out some interesting comparisons as to the relative number of trees which have grown at high and low rates. This is shown by the following table:

Method of cutting	Per cent of trees which have grown — 0.3 in.	1.0 in.	2.0 in.	3.0 in.	4.0 in.	5.0 in.	6.0 in.	Average diameter growth
Group selection	6	33	40	15	5	1	-	1.89
Scattered seed tree	2	17	36	29	12	3	1	2.48

The table shows that the percentage of trees which increased two inches or less was greatest in the group selection cutting, while for increases of over two inches the highest percentage was in the scattered seed tree cutting.

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Manuscripts

California

A Tree Classification for the Selection Forests of the Sierra Nevada. By Duncan Dunning.

Dissemination by Wind of Seed of Important Conifers of California. H. W. Siggins.

Southern

Progress Report on Loblolly and Shortleaf Pine Thinning Plots at Urania, La. By L. I. Barrett and E. W. Gemmer.

Southwestern

The Measurement of Physical Factors in Silviculture. G. A. Pearson. (For Ecology).

Appalachian

Suitability of Brushlands in the Intermountain Region for Western Yellow Pine Forests, F. S. Baker and C. F. Korstian. (Revision: for Dept. Bulletin)

Central States

Factors in the Frost Resistance of the Leaves of Native Ohio Evergreens, Bernard S. Meyer.

Northeastern

Podsol Soil: Its Physical Characteristics and Silvicultural Importance. P. W. Stickel. (To Ecology)

Comparative Forest Fire Hazard in the Northeast. P. W. Stickel. (To Jour. of For.)

Preliminary Yield Tables for Second Growth Western Yellow Pine in the Inland Empire. C.E. Behre. (Univ. of Idaho and J.A.R.)

Pacific Northwest

At the Forest Cross-Roads. T. T. Munger. (For "Commonwealth Review" of University of Oregon.)

Northern Rocky Mountain

Forest Research Activities in the Northern Rocky Mt. Region. By R. H. Weidman.

Non-indigenous western yellow pine plantations in Northern Idaho. By Gerhard Kempff.

Life Histories of Some Western White Pine Stands on the Kaniksu National Forest. Robert Marshall.

An Investigation of Lightning Storms in the Northern Rocky Mountain Region. H. T. Gisborne.

Prolific Seed Production in the Forests of Northern Idaho. R. H. Weidman.

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IN PRINT

Bates, C. G. A glance around. (Jour. of For., November, 1927.)

Bates, D. B. A vision of the future Nebraska Forest (Jour. of Forestry, Dec. 1927.)

Hansen, T. S. Forest planting experiments in Minnesota. (Univ. of Minn. Agr. Expt. Station Bul. 238).

Kittredge, J. Jr. Management of the maple-basswood type in northern Minnesota. (Jour. of For. Dec. 1927).

Meyer, Bernard S. Studies on the physical properties of leaves and leaf sap. (Ohio Jour. of Science, 1927).

Pearson, G. A. and F. A. Follweiler. Acceleration in growth in western yellow pine after cutting. (Jour. of For. December, 1927).

Reineke, L. H. A modification of Bruce's methods of preparing timber-yield tables. (Jour. of Agr. Res., November 1, 1927).

Wakeley, P. C. American forestry and the metric system. (Jour. of For. Dec. 1927).

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Service Test Records

The 1927 inspection reports for the Choteau-Ear Mountain telephone line, two Northern Pacific test tracks and the Anaconda Copper Mining Company's creosoted posts, poles, and mine timbers at Butte and Rocker were completed during the month. In all of these cases the records brought up to date apply to test timbers which have been in service for rather long periods of time.

No decay was found in any of the butt-treated lodgepole pine stubs with which the Choteau-Ear Mountain line was stubbed in 1917. In most cases an appreciable quantity of oil was found in the soil adjacent to the wood, indicating that the stubs had been very thoroughly creosoted.

All of the butt-creosoted lodgepole pine poles placed in service at the rifle range near Rocker, Montana, over 15 years ago are still sound and no decay could be detected in the untreated tops. A complete penetration of the sapwood to an average depth of 1.38 inches was obtained in the butt-treatment of these poles.

Nearly all of the round creosoted Douglas fir timbers placed underground on the 1100 and 2000-foot levels of the Original Mine in 1911 are still in service. A brief summary of condition for the 62 caps and 122 posts in this test follows.

	Caps per cent	Posts per cent
Sound	59.6	40.2
Partly decayed	34.0	36.9
Decayed	6.4	17.2
Removed	0	5.7
	100	100

The timbers classed as partly decayed are only slightly affected by rot in streaks or spots where strips of bark had prevented a good penetration of the preservative. In those classed as decayed the rot has reached a more pronounced stage but it is unlikely that any replacements will be made in the near future.

In the series of mine timber inspections made in the Butte district last September some especially good results from a creosote pressure treatment were observed in a drain tunnel on the 2800-foot level at the Tramway Mine, where about 100 treated Douglas fir

sets had been installed in 1915. In this location the temperature averages about 98° F. and the humidity about 90% with very little circulation of air. These creosoted timbers were in remarkably good condition after 12 years of service and none had been replaced. Untreated timbers previously installed in this tunnel had shown an average life of only about two years.

The inspection results for the old Northern Pacific Test Track near Plains, Montana, show that 23% of the zinc chloride-treated Douglas fir and 37% of the western larch ties also treated with zinc chloride and laid at the same time are still in the track after being in service 20.6 years.

In addition to the work done on various projects, a considerable number of inquiries about wood preservatives and other matters were answered during the month.

Depreciation in Fire-Killed White Pine

Compilation work on the data collected during July in the depreciation in fire-killed white pine study has progressed steadily during December. Individual data on 3000 white pine logs were tallied through the mill by the crew. The office work of computing, compiling and comparing is being done by a temporary clerk. The work has not progressed to a point where final comparisons may be made and results determined.

It is interesting to note, however, the kind and amount (in per cent) of log defects caused by the fire and the proportion in which these defects are increased in the second year after the fire. Western white pine timber burned in 1925 and 1926 on the Kaniksu Forest was logged during the winter of 1926-27 by the Dalkena Lumber Company. Logs from timber burned in 1925 and 1926 were separately stamped in the logging camps and later sorted out when the drive came down in the spring of 1927. The following table gives the kinds and amounts (in per cent) of fire defects found in the average log of selected runs of 1925 and 1926 fire-killed white pine timber. Only those logs from which the scaler actually made defect reductions are included. A majority of the logs tallied through the mill were scaled as sound as is the standard practice though all of them showed more or less blue stain. The figures given have not been checked for final publication.

Year timber burned	Log Defects Caused by Fire				
	Decayed sap	Checks	Wormholes	Other - Catface, scars	Total
1926	3.3%	8.7%	4.0%	0.5%	16.5%
1925	3.4%	9.1%	22.9%	-	35.4%

The checking, staining, and decaying of the sapwood obviously occurs somewhere within the first 9 months after the fire. A certain percentage of these defects will have resulted from driving. A study made in 1925 shows a loss in footage of 1.01% in river-driven logs which reach the mill. The loss in footage (log scale) due to insect attack increases rapidly in the second year following the fire. The 4% loss in footage, due to wormholes which occurred in timber burned the preceeding summer is increased to 30% during the second year after the fire. The insect attack during the first year was confined almost entirely to the sapwood of the log. Two years after the fire many logs that were opened up in the mill were completely riddled with wormholes. In lumber grading wormholes are considered a serious defect. Their appearance even in limited numbers will reduce the grade to No. 3 Common or poorer.

The annual report for this office was prepared and sent to the Secretary of the Committee December 31.

Lumber Prices and Movement

Prices	First Q. 1927	Second Q. 1927	Third Q. 1927	October 1927	November 1927
Idaho White Pine	$38.48	$38.41	$36.77	$35.04	$30.13
Pondosa Pine	26.28	26.72	25.97	24.03	24.20
Douglas Fir & Larch	17.62	18.92	18.83	18.16	17.51
White Fir	16.46	18.02	18.56	18.65	15.96
Spruce	23.77	24.09	23.34	23.80	19.76

	December, 1926.	December, 1927.
Cut	126,689	110,303
Shipments	131,516	115,495

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Cooperation Extended the Office of Lands in Connection with Taxation Study

At the request of the District Forester the Office extended cooperation to Lands on the taxation study, Spelman devoting 13 days to this work and Hodgson 9 days.

San Francisco Meeting of the Society of American Foresters

Messrs. Hodgson, Johnson, Spelman, and Gibbons attended the annual meeting of the Society on December 16 and 17, the three latter also making the field trip into the Redwood region. As a result of what was seen, heard, etc. at the meeting, all members of the Products Office are now more Society conscious than heretofore.

Mill Utilization Study

Reference was made to this study in last month's report. Johnson spent about 8 days in starting the compilation. With data on 2600 logs involved he barely made a start on this job.

Kiln-drying Douglas Fir Common

At the request of Mr. Keith of the Oregon-American Lumber Company, Vernonia, Oregon, Mr. Johnson made a comparison of the results obtained in the kiln-drying study at this plant with those obtained in the air-seasoning studies at the Carlisle Lumber Company, Onalaska, Washington, and at the Long-Bell Lumber Company, Longview, Washington. The comparison was confined to one and two-inch No. 1 Common Douglas fir. In the case of the one-inch stock the comparison was made on two bases: First on a "shipping practice" basis, that is, including encased-knotted stock; also on a strictly "book" grade basis, that is, not including any encased-knotted stock. In both instances the air-seasoning showed a much greater degrade than the kiln-drying. On a "book" grade basis the degrade was:

Name of Company	Method of Seasoning	Average Moist. content	Drying[1] degrade	Machining degrade
Oregon-American Lb. Co.	Kiln-drying	20.2%	0.77%	3.98%
Carlisle Lbr. Co.	Air-seasoning	15.6%	45.43%	0.56%
Long-Bell Lbr. Co.	" "	14.6%	12.42%	8.47%

[1] The drying degrade was largely due to surface checks.

On a "shipping practice" grade the degrade was:

Name of Company	Method of Seasoning	Average Moist. content	Drying degrade	Machining degrade
Oregon-American Lbr.Co.	Kiln-drying	20.2%	3.01%	3.17%
Carlisle Lbr. Co.	Air-seasoning	15.6%	51.10%	0.45%
Long-Bell Lbr. Co.	" "	14.6%	27.01%	6.92%

The increased degrade was due to loose knots and knot holes.

In the case of the two-inch stock the degrade was small. The total degrade was 3.23%, 5.44%, and 2.31% respectively.

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Range Research

Washington

December proved to be the usual disrupted month. Some time was spent during the month in organizing material for the Congressional hearings and for the report on the range research item of the McSweeney-McNary Bill.

Publications

Mr. Forsling resubmitted his revised manuscript, "The Utilization of Mountain Brush Lands of Southwestern Utah as Summer Cattle Range." Mr. Chapline's "Watershed Protection on Cattle Ranges" came out in THE PRODUCER and resulted in a request from Dr. Woods to prepare a manuscript covering "Erosion on Western Grazing Lands." Accordingly the planned vacation went by the board and most of the last of the month was spent in working on this manuscript. It is expected that this manuscript will come out jointly with an article on "Some Aspects of the Wastage" by H. H. Bennett of the Bureau of Chemistry and Soils in a Department Circular, "Soil Erosion a National Menace."

FORAGE INVESTIGATIONS

Plant Routine During December

Nine collections, representing 155 specimens, were submitted to the Bureau of Plant Industry during the month for determination. One collection, representing 11 specimens, was reported on to the field. There was, however, heavy miscellaneous plant-identification correspondence during the month, - check-identifications, partial reports on collections, etc. A considerable number of plants came back from the Bureau of Plant Industry in the latter half of the month and much work has been done in lining these up for future report to the field. About 600 specimens were filed in the herbarium and 238 were mounted.

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MISS HAYES ATTENDS A.A.A.S. CONVENTION AT NASHVILLE

Miss Doris Hayes made a trip to Nashville during Christmas week to attend the meetings of the American Association for the Advancement of Science, especially those of the ecological section.

The biological phases of ecology seemed to receive considerable emphasis in the papers presented and also in the discussions. The need and also the increasing difficulty of securing publication of papers on community studies or on general biology were considered in a meeting of the Committee on Research Publications. It was voted that the journal "Ecology" print an additional issue each year in order to meet this demand in some measure.

On the return trip a stopover was made at Knoxville, Tennessee, where the Chamber of Commerce conducted a party of scientists through the Great Smoky mountains. A number of botanists were in the group, including Dr. Nichols, the Ecologist of Yale University. A hike to the top of Mt. LeConte, one of the highest peaks, was the main feature of the trip. The ascent was made one day and the return the next. Most of the time during the climb was devoted to noting various habitat factors and the reflection of these as manifested in the distribution and dominance of species. The vegetation varied from the hardwood forests at the base of the mountain to the coniferous (balsam and spruce) forests dominant at the top. The return trip was not so conducive to study as the mercury had dropped to 20 below zero during the night, and snow had covered most of the plants.

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DISTRICT 3

December has added the closing month to a year of seasonal conditions very favorable to live stock and ground cover on the low altitude, mountainous areas of south central Arizona. Warm, dry weather for the most of the period from October to early December favored perfect curing of herbaceous vegetation. December rainfall totaling two inches or better has kept browse in a functioning state, that state of greatest palatability for the particular season, and has made probable a good growth of winter and spring annuals. Alfileria, (Erodium cicutarium) the winter annual of probably the most forage value, appeared very early. It was quite noticeable at 3500' elevation and downward after the heavy rains in September. Specimens produced before January usually live thru until February and March as very inconspicuous rosettes of leaves. The small rosette produces a long tap root that enables it to respond, as if by magic, to warm days and spring showers. Plants germinating in the spring frequently have insufficient root system to withstand the warm days between showers. Early germination often accounts for the variation in size of plants so noticeable in spring. Fall rains while warmth for germination may be expected are important as to quantity of alfileria produced.

Some time has been given to the compilation of data (growth and utilization) from a large number of plots on the open range in browse associations outside the true chaparral belt. A few indications are given as follows:

1. Total density of parennials differs widely as between small area associations; slope, exposure, and present soil character being the determining natural influences. In average, density is more or less constant or similar as between large, general types in the same belt. A density of .2 to .25 is average for types in which open crowned shrubs predominate and .25 to .3 where closed crowns are prominent.

2. Shrubs seldom fall below 75% of the vegetative composition on plots long over-utilized. Grasses range form a trace upwards in percentage of composition. They are usually less in amount of the remaining 25% not occupied by shrubs than are weeds.

3. Plots in range continuously over-utilized for many years may show in per cent of composition dominance of either palatable or unpalatable browse. In such instances dominance among large shrubs, few above the reach of cattle, is probably dependant on composition relation of the same species prior to the period of intense use. At least this is probably true for the period of the average life cycle of the shrubs concerned. Grasses in such an association seem to have been replaced by less palatable shrubs and weeds. These in turn are largely destroyed under continued overgrazing. Large shrubs remain fairly constant in numbers for a period of years. There are a number of reasons for this being true. Browse plants in average are less palatable to cattle than the average of even sub-climax herbaceous plants. They are also long lived and very resistant to grazing as compared to the grasses. Progressive retrogression, as it affects browse, is simply slower in the large browse associations than is its effect on herbaceous vegetation in the small browse, grass associations. There are notable examples where certain species of large browse disappear from the type under overgrazing. Mountain mahogany (Cercocarpus arizonica) is an example of a very palatable and very resistant shrub that is frequently killed by repeated over use. Bear grass (Nolina spa) could not be considered a highly palatable plant except for its flower stalk buds and surrounding young leaves; however, in emergency the entire plant will be grazed to the ground by young cattle. Under such use Nolina is among the first large browse plants to suffer extermination. Large shrubs immune to grazing do seem to be increasing, but it is too slow a process to measure in a period of a few years. Also, browse of inferior forage value undoubtedly passes from desert into semi-desert and from semi-desert into chaparral belts as loss of moisture thru abnormal run-off and decreased competition make possible their establishment.

From either the standpoint of protection or forage value a very interesting comparison exists between plots long grazed on thebasis of heavy browse utilization and those plots protected or moderately grazed for even a short period of years.

Grazing Values

Plots protected for seven years indicate that present average densities for types in the open may be changed from (.25 or .3) to (.35 or .4) where grass still forms at least 5% of the vegetative composition at the time of protection. The greater part of the density increase is from grass.

Areas protected or but lightly used for many years indicate that surface cover was formerly an average of .45 to .65 density rather than .2 to .3 and that 30 to 75% of the composition was herbaceous in character.

Color Values

Steep slopes supporting a vegetative density of .2 to .35, of which not more than 2 to 5% is grass and 5 to 25% weeds, have been gullying for years. Similar slopes supporting a density of .35 to .5 with a composition of from 25 to 50% grass are not being noticeably eroded.

These facts simply emphasize the importance of herbaceous vegetation where browse does not entirely occupy the ground. In extremely mountainous regions like that under study; slope, exposure, and physical character of soil alone make for many small vegetative associations within the average broad type. Types 75% browse are composed of associations that grade from 95 to 10% browse. The grass spots are the important feed spots that must be perpetuated if stock growing is to prosper. They are also the spots that influence the watershed merit of the whole drainage.

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DISTRICT 6

Two events of importance in connection with the study being made in the Northwest of grazing on Douglas fir cut-over lands should be mentioned in this report.

The first was the seeding of range to grass by airplane in Coos County, Oregon; the other a meeting at Chehalis, Washington, on December 13, to encourage use of cut-over lands in western Washington for sheep grazing.

Grass Seeding by Airplane

Details regarding the first are that 1200 acres of recently cut-over and burned land in the Douglas fir type purchased by the Coquille Valley Sheep & Wool Co. and located near Coquille in Coos County, Oregon, were seeded early in November 1927. A contract to seed a total of 1900 acres was let to two local aviators, N. W. Perkins and H. R. Adams. These men by means of a specially constructed hopper scattered 6000 pounds of seed in 10 hours and 45 minutes of flying time, making 24 trips. The seed - a grass mixture - was sown at the rate of 5 pounds per acre, less than half the amount required in hand sowing. Reports to date are that the experiment is a decided success in obtaining a good stand of grass at a cost of 50¢ per acre, compared with the usual cost of $1.25 to $1.50 per acre for hand sowing. This experiment is being watched with great interest and if successful will doubtless be duplicated.

Meeting at Chehalis, Washington

The Chehalis meeting was largely inspired by several cut-over land owners, (including J. T. Alexander, well-known banker, farmer, and lumberman of that city), who have for several years been interested in developing the agricultural possibilities of cut-over lands in western Washington. Over 300 lumbermen, farmers, and county and state representatives attended the meeting. Plans for the lease of blocks of cut-over land and the purchase of a number of small bunches of sheep were made as a result of this meeting.

Since this movement is largely confined to the level lands at medium elevations, some of which have agricultural possibilities, it has received little support, opposition, or interest from the Forest Service.

These two incidents are, however, significant of the growing "urge" on the part of private operators in the Douglas fir region to make some use of their cut-over lands as a means mainly of securing some immediate return sufficient at least to meet the tax burden. It is believed this movement is growing in spite of all the effort through national and state forestry legislation (which makes no mention of grazing use) to promulgate forestry practice for privately owned lands.

Whether this movement can be capitalized and this effort directed toward temporary grazing use as a means of reducing fire hazard pending the time the second crop of timber is harvested remains to be seen. This latter may be said to be a major objective of the "grazing management of cut-over lands" experiment in the Northwest.

Columbia Project

Ingram was principally engaged in December in compilation and analysis of the vegetative data secured on this project on the Columbia Forest. Some interesting features of the three-years' data indicative of the trend of succession under protected and grazed conditions will be discussed in next month's report.

Addition to D-6 Herbarium

Through the generosity of Grazing Examiner Renner of the Wenatchee Forest, the District 6 herbarium is the richer for 38 plant specimens collected by Renner in 1923 on the Santa Fe Forest, and not found in the Northwest. Coming as it did at Christmas from Santa's own Forest, this gift of southwestern specimens was doubly appreciated. This collection, Renner states, after 1194 specimens had been collected on the Santa Fe Forest, contained

11 additions to District 3 records;
3 first-known collections for New Mexico;
1 new genus for Forest Service records;
13 first Forest Service records;
2 second-known collections.

This is in direct line with the Forester's suggestion for the distribution of extra plant material among the Districts.

Wider Distribution of "Research Report"

A recent note from Grazing Examiner Renner on the Wenatchee requesting the loan of our back file of the "Monthly Research Report" brought to light the fact that the Forests (in District 6 at least) have not in the past been supplied with this mimeographed publication.

Perhaps it was not the original intention to broadcast to the field detailed information as to what Research men are doing. The report, however, contains much of general interest and it seems desirable that interest in our work by our brethern in administration no less than by the layman be encouraged. There would appear no better medium than through current perusal of this report.

Will not the receipt of copy of the "Report" monthly by the Supervisor's office prove an excellent ambassador - a good PR contact? We think it will to the extent of asking that each Forest in District 6 be supplied with a copy monthly. Will the Editor oblige?

(Two extra copies will be sent in the future for circulation.--Ed.)

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JORNADA RANGE RESERVE

Range Conditions and Precipitation

Some snow fell during the month, but not enough to produce a satisfactory growth of winter weeds. The mornings are cold, but very stimulating for outdoor work.

Cattle Sales

Cattle are in good shape. A roundup was held at the station during the first two weeks of the month. Approximately 300 steer and heifer calves were shipped. Prices have not been finally reported as yet, but they were top; another solid argument in favor of high grade cattle and conservative stocking. The quality of the breeding herd was materially improved when 30 old bulls and 35 cull cows were shipped.

Investigative Work

The station personnel has been working up the Annual Report, which will be completed by New Year's Day.

Personnel

Campbell made a trip to El Paso on Christmas Eve to meet research workers who were passing through on their way to the Nashville Meeting of the A.A.A. They were Prof. H. C. Cowles, University of Chicago; O. H. Brown and Wm. G. McGinnies, professors in the University of Arizona. Unfortunately, the bridge over to Juarez, Mexico, was closed when the party arrived in El Paso.

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Barbershop English

Every once in so often some one will want to know why it is that editors have no respect for a writer's style, but plow right through a manuscript switching clauses, rehitching phrases, substituting connectives, changing phraseology and recasting sentences and paragraphs generally, until the resultant manuscript is more patches than whole cloth and the writer's originality of diction and freedom of style, his inimitable way of saying what he has to say (which no one else can duplicate any more than one can duplicate his thumb-print), his God-given ability to express himself idiomatically, all this is travestied, debauched, ruined, and in its place is a poor, dried-up, weazened, be-spectacled, misbegotten text that no one but an editor would care to own. When any one says all this, the editor (after quietly noting that a 150-word sentence is contrary to Rule 7,385) accepts the statement with a smile that he tries not to make too broad and changes the subject as deftly as possible. That is the retort courteous, and about the only possible one.

Some writers have a style of their own. I know at least one in the Forest Service; I am willing to admit that there are others. The one person I have in mind works harder at his efforts to express himself in prose than anyone else I have happened to encounter. The result of this intense effort, coupled with a very clear concept of what he wishes to express, is style. Given the right raw materials and a tremendous intensive effort on nature's part, and you get a diamond. Style is like that. But even a diamond needs cutting and polishing before you are willing to wear it in your shirt-front.

Possibly most of us are too busy to go in for a diamondlike style. But I think not. The individual I have mentioned is one of the very busiest persons in the Service. He happens to put a high value on adequate expression of his ideas, and in this person's lexicon "adequate" and "best possible" are synonymous.

What the editor gets in about 60 per cent of the manuscripts that come to his desk in their original form is not so much style as what he has been repeatedly tempted to term "Barbershop English."

The next time you are undergoing the torture of 30 minutes of utterly wasted time in a barber chair, notice the speech as she is spoke around you. It will go something like this:

"Seebillrown-nware?"

"Noint seenm. Zhulknfemm?"

"Yeah. Pardollfme lasweek."

"Guessy sawyefirss. Yukin kissthadol gby."

"Whow?"

This conversation bears about the same relation to ordinarily intelligible every-day talk that much of the language in our Research manuscripts bears to precise, clear-cut, scientific English. You think that that is a facetious exaggeration. Alas, no! And it often seems to be the research worker who most prides himself on his ability as a writer who falls the farthest. He mistakes facility or fluency for good writing. His more successful and more humble fellow-worker knows, as most editors know, that pride finds seldom a more treacherous footing than in the fancied ability to write perfect English.

Barbershop English, as found in our manuscripts, is characterized by certain failings that, it would seem, anyone could correct who cared to do so. The "yaller-dog" pronoun, for instance - of doubtful or at best very confused antecedents. I have known a writer, one who objected rather strenuously to editing, to have 3 yaller-dog pronouns on every 10 pages - "it's" that referred back to nothing more tangible than the implication of a previous sentence; "this's" that generously embraced a whole paragraphful of ideas and might refer to any one of them or to the composite whole, as the reader might prefer; "them's" that seemed to claim relationship equally well with two or three plural nouns. The yaller-dog is a common failing. It wriggles its way into the best writing. The important thing, however, is that it can easily be detected. Every pronoun should be required to show its pedigree.

Siamese-twin nouns and verbs - that is to say, singular verbs and plural nouns, or the reverse - are another characteristic feature of barbershop English. These too, must always yield to close scrutiny. They are not so objectionable, from the editor's point of view, as the golddust twins "former" and "latter." Users of these two words are generally addicts; they have listened to the voice of the advertiser, who has urged mankind to "let the golddust twins do your work," and it is hard to shake them loose from this easy habit. Let the reader beware! He has plenty of time on his hands; let him chase back to the sentence-before-last and see for himself which is "Trade" and which is "Mark." He ought to have remembered them anyway. If "former" and "latter" happen to refer to a series of three or more things, as they frequently do, that's just to make the puzzle really interesting.

Quilted phraseology is another high light of barbershop English. The vocabulary of the two men quoted above was not so much one of words as a vocabulary of trite phrases. Much the same thing seems to be the stock in trade of some scientific writers. They may converse in a clear-cut manner, but when they turn to writing they seem to feel it necessary to clothe thought more securely in a great deal of padding. So the nice, wooly "condition in which's" and "from the standpoint of's" and "on the basis of's" are kept at hand, with the "point of view's" and the "there is's." One-third of all sentences or clauses must begin with "there is"; all verbs must be in the passive voice; the subjunctive must be used wherever possible instead of the present or future indicative. Without such and similar clothing, they evidently fear, truth will appear unseemly.

Space lacks to mention all the familiar evidences of barbershop English. Brief mention must be given, however, to a few, such as the cross-eyed sentence that is not meant to be read the way it looks. The familiar form of this sentence is the well-known classified advertisement: "For Sale. A grand piano by a gentleman going west with carved legs." "Careless planting is largely a matter of experience and care" is a variant of the cross-eyed sentence.

The fourth-dimensional "while" is another old friend. "These grew 2.5 feet in 10 years, while the others attained a growth of 3.7 feet in 15 years" is the usual form. It is reasonable to expect "while" to mean "at the same time," but the fourth-dimensional while transcends ordinary human experience and links aeons with years, days with months, and associates in a strange time-dimension facts that would seem to have no evident time quality.

"Billy due" should also be mentioned. He is a general favorite. Due, of Billy as one might familiarly call him, has just one function, in common with many another adjective, and that is to modify a noun. He is, however, becoming rather a scamp; one finds him everywhere. "The experiment was a failure, due to..." is not the place for Billy. "The failure was due to..." or "This failure due to lack of good seed was regrettable" show Billy hard at work where he belongs.

But the important point about all these barbershopisms is that all of us know them for what they are, and if we saw them as they are we would never use them. To avoid them in the heat of writing may not be possible. A cool and clear-eyed revision of the manuscript generally brings them to light. Most people do not wish to write "Different than," or "These trees died frequently," but many do. Somewhere along the line these and a lot of other barbarities must be edited out. Why not let editing, like charity, begin at home?

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